INDIANA
DEPARTMENT *of*
EDUCATION

SECONDARY STEM CERTIFICATION GUIDE

2023-2024

STEM in Indiana

[Indiana's Priorities for STEM Education](#) seek to develop a sustainable model for preparing educators to provide high-quality STEM learning opportunities by integrating the disciplines of science, technology, engineering, and mathematics to maximize student learning and achievement. The following are Indiana's Priorities for STEM Education:

1. Refine STEM pedagogy with research-based practices.

2. Develop STEM leaders and educators.

3. Increase access to STEM courses, programs, and resources.

Through these priorities, the Indiana Department of Education (IDOE) supports schools in refining current STEM initiatives and establishing new opportunities to prepare the next generation of thinkers, creators, advocates, and entrepreneurs.

Vision

IDOE will collaborate with educators and schools across the state to implement Indiana's Priorities for STEM Education in an effort to provide access to high-quality, integrated STEM instruction and to increase student participation and achievement related to integrated STEM learning opportunities. In a constantly evolving world, STEM education will prepare all students to contribute to society through innovative problem solving as the next generation of thinkers, creators, advocates, and entrepreneurs.

Mission

Indiana's Priorities for STEM Education seek to develop a sustainable model for preparing educators to provide high-quality, integrated STEM learning opportunities to students, as well as support and provide resources to educators during implementation. This will be achieved through a collaborative process of professional development promoting research-based practices. These priorities will ultimately result in providing students with an engaging, integrated STEM education experience that prepares them for emerging STEM careers and educational opportunities.

STEM Education Defined

Integrated STEM education is the purposeful integration of science, technology, engineering, and mathematics through an engaging and motivating student-centered pedagogy and curriculum. Students are engaged in solving real-world problems using inquiry-based learning, problem-based learning, and engineering design practices, which require critical thinking and collaboration. Highly-trained and well-supported educators are key to providing these experiences to students.

The *STEM classroom* works toward the integration of science, technology, engineering, and

mathematics across content areas. Students pose questions when faced with real-world situations. Investigation, productive struggle, and innovation foster a culture of collaboration and creation. Students are partners in the teaching and learning process by developing skills to reason abstractly, model with science and mathematics, and justify their reasoning to express ideas precisely.

Problem solving is the engagement in a task for which the solution method is not known in advance.[1] The definition includes the willingness to engage with such situations in order to achieve one's potential as a constructive and reflective citizen.[2] In the STEM classroom, methods of problem solving could include, but are not limited to, productive struggle, rich tasks, modeling, and inquiry- and project-based learning.

STEM School Certification

Since 2015, Indiana has certified more than 100 schools as leaders in integrated STEM. The STEM Certification process exemplifies the importance of inquiry-based learning (IBL), project-based learning (PBL), community engagement, student-centered classrooms, and out-of-school STEM activities. Schools receiving the distinction of an Indiana STEM Certified School have aligned their programs with the mission, vision, and three priorities outlined in Indiana's Priorities for STEM Education.

Evolving into a STEM school environment is much more than introducing a program. It requires establishing a common local agenda to significantly improve student performance, incorporating STEM education at all levels, engaging local businesses and the community, and often adopting new curriculum and implementing new instructional practices. A school's success depends on prioritizing STEM pedagogy and implementing effective models. The Secondary STEM Certification application consists of three parts: *Essential Elements, Additional Showcase Artifacts,* and the *Site Visit.* Requirements and guidance for each part of the application are provided in this document.

Eligible entities for Secondary STEM Certification include Indiana accredited public, public charter, accredited non-public schools, and career centers. The Secondary STEM Certification application process requires the creation of a Google Site (or an approved alternative), using the provided template, to document evidence of a school's STEM implementation. This process is used for new schools to become certified, as well as those renewing their certification.

Note: Certification is valid for five years. Schools seeking to retain STEM Certification must reapply following the timeline and process as described.

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[1] National Council of Teachers of Mathematics (2013)
[2] OECD (2013)

2023-2024 STEM Certification/Recertification Timeline	
Friday, May 26	IDOE publishes the 2023-2024 STEM Certification application materials for elementary and middle schools.
Friday, October 27	STEM Certification applications are due to IDOE.
Wednesday, November 22	IDOE reviews applications.
Friday, December 8	IDOE provides application feedback to schools.
Friday, January 12, 2024	Schools respond to IDOE with additional application evidence, as needed.
Friday, February 2, 2024	IDOE provides second round feedback to schools.
Friday, April 12, 2024	IDOE STEM Certification Review Team completes site visits.
Monday, May 6, 2024*	IDOE formally announces the list of 2023-2024 STEM Certified Schools.

*This date remains tentative.

The list of STEM Certified Schools and STEM Certified Programs, by cohort, can be found here.

Secondary STEM Certification Application Process

Applications are due Friday, October 27.

This guide provides information for secondary schools applying for STEM Certification. Secondary STEM Certification is divided into three parts:

1. Essential Elements
2. Additional Showcase Artifacts
3. Site Visit

Directions for each section are listed below and provide guidance to assist schools in scoring the necessary points to achieve STEM Certification.

New Features and Key Differences

Secondary STEM Certification provides an opportunity to highlight integrated STEM programming to junior/senior high schools and career centers. Listed below are key differences between the Secondary and K-8 STEM Certification processes:

- The Essential Elements are evaluated in a separate group. Essential Elements comprise their own section of the application and are scored using a checklist that represents the evidence needed to earn the maximum points. If a school needs additional details on the Essential Elements, clarification can be provided during the required meeting with IDOE's STEM team prior to the application deadline.

- The site visit in Secondary STEM Certification is heavily weighted. When meeting with stakeholders and experts, the overwhelming feedback was that schools seek the opportunity to show STEM programming in a way that curating evidence for a Google Site may not allow.

- To be eligible for STEM Certification, at least one representative from the school's STEM leadership team must meet with IDOE to receive feedback on Essential Element 1 and plan for the Additional Showcase Artifacts.

- Schools must earn all points on the Essential Elements when submitting the Google Site. IDOE will provide synchronous learning opportunities during the application process to ensure all schools understand the requirements.

INDIANA DEPARTMENT of EDUCATION

The Roadmap to Secondary STEM Certification

1 Complete the Self-Evaluation Reflection to determine readiness for Secondary STEM Certification and schedule a meeting with the IDOE STEM Team to discuss Essential Element 1. The meeting should be scheduled by Friday, September 15.

2 Turn in your application for Secondary STEM Certification by Friday, October 27.

3 IDOE STEM Team will score applications. To earn a site visit, a score of 21 on the Essential Elements and a score of 20 on the Additional Showcase Artifacts is required. This adds to a total of 41 points.

Schools that do earn 41 points will have site visit scheduled where additional points will be earned to receive the designation of **STEM Certified**.

Schools that earn less than 41 points will be designated as **Developing** and invited to participate in a learning series with IDOE to assist with additional areas of growth.

STEM Certification Scoring Overview

Schools must earn 94 points to achieve STEM Certification. A maximum of 45 points can be earned on the Essential Elements and Additional Showcase Artifacts, which are submitted on the Google Site.

	Total Points Possible	Minimum Points for Site Visit	Designated Developing
Essential Elements	21	21	<21
Additional Showcase Artifacts	24	20	<20

If the combined score is greater than or equal to 41, a site visit will be conducted to complete the scoring process. Submissions scoring fewer than 41 points will be designated as *Developing* and invited to participate in a STEM Certification Learning Series beginning in January 2024.

	Total Points Possible	Minimum Points for Secondary STEM Certification
Site Visit Essential Elements	39	39
Additional Site Visit Indicators	21	14

The table below illustrates the total number of points needed in each part of the application to earn Secondary STEM Certification.

Essential Elements	Additional Showcase Artifacts	Site Visit Essential Elements	Additional Site Visit Indicators	Total Points
21	20	39	14	94

Description of Essential Elements

The Essential Elements listed below are required for Secondary STEM Certification. Schools must provide all of the required items in each checklist to receive the necessary score of three to be eligible for a site visit. IDOE will provide feedback regarding submitted elements using the checklists. Additional details for each Essential Element are provided below. Please contact IDOE's Office of Teaching and Learning to request further clarification on any of the required elements.

While each of the Essential Elements represents one aspect of the STEM program, the required evidence submitted should convey a connected, integrated, and collaborative picture of STEM in your school. Reference the following checklists when completing and submitting your school's application. Schools that do not earn 21 points in this category will receive the designation of **Developing**.

Essential Element 1

This element is double weighted.

Mission and Vision	Requirements Checklist
The STEM leadership team provides a narrative that defines a mission statement for the STEM program and describes a vision for how identified STEM programming connects to the mission.	☐ Roster of team members ☐ Mission statement ☐ Courses and pathways included in the defined STEM program ☐ Total student enrollment and demographic breakdown in each of the identified courses for the defined STEM program ☐ Roster that includes teachers in the defined STEM program trained in problem-based learning (PBL)/inquiry-based learning (IBL) or STEM integration, virtual/blended learning best practices, and evidence of common work time for teachers ☐ Detailed plan that highlights the development of the STEM program over the course of a two-year implementation

The goal of **Essential Element 1: Mission and Vision** is to give secondary schools and career centers the opportunity to define the scope of STEM Certification at their school. IDOE recognizes many different configurations of grade levels and programming at the secondary

level and has developed the **Requirements Checklist** to support the **Mission and Vision** narrative developed in collaboration with the STEM Leadership Team.

Essential Element 1: Mission and Vision Requirements Checklist

☐ *Roster of team members:* The roster of STEM Leadership Team members must include at minimum one building level administrator, two teachers from your defined STEM program, one school counselor or career coach, two students, and one parent.

☐ *Mission statement:* The mission statement should reflect the goals of the STEM leadership team and clearly support the vision of the defined STEM program. The mission statement should communicate the purpose of the defined STEM program while providing connection between the artifacts included in the application for STEM Certification.

☐ *Detailed plan highlighting the development of the defined STEM program:* The foundational component of this artifact is a clear and precise definition of the STEM program being certified. Additionally, this requirement can be, for example, a narrative supported by examples of decisions, outcomes, reflection, and revision during the past two years or running meeting notes from STEM leadership team meetings.

Essential Element 2

Interdisciplinary STEM Projects	Requirements Checklist
At least 90% of teachers are implementing interdisciplinary STEM projects that are evidence-based and aligned to Indiana Academic Standards.	☐ Description of model that is the basis for teacher-created units and/or other providers (i.e., 5-E, PBL Gold Standard) ☐ Implementation plan that shows overall frequency and number, the name of interdisciplinary projects within the defined STEM program, the calendar of project implementation, and alignment to appropriate standards (Advanced Placement [AP], Career and Technical Education [CTE], Indiana Academic Standards [IAS], dual credit agreement) including employability skills standards

The goal of **Essential Element 2: Interdisciplinary STEM Projects** is to provide evidence of the scope of implementation of refined STEM pedagogy within the defined STEM program. Interdisciplinary projects can include a variety of disciplines but should at minimum include at least two STEM disciplines from the defined STEM program.

Essential Element 2: Interdisciplinary STEM Projects Requirements Checklist

☐ *Description of model:* Focusing on the defined STEM program described in Essential Element 1, provide a description of the model(s) (i.e., 5-E, PBL Gold Standard) used as the basis for creating interdisciplinary units. Include connections between the choice of model and the mission of the STEM leadership team described in Essential Element 1 and how it adds clarity to the overall program goals.

☐ *Implementation plan:* This artifact should be designed to include the names of educators that are listed in Essential Element 1 along with the information included above. Projects included in this implementation plan calendar/roster should be displayed in a way to support engagement with the STEM environment in preparation for a potential site visit. *(*See *STEM Environment* in the site visit rubric.)

Essential Element 3

Computer Science Implementation	Requirements Checklist
The implementation plan for computer science includes active recruitment and enrollment of students to reflect the demographic of the school.	☐ Implementation plan ☐ Course list/guide ☐ Course enrollment/completion data

The goal of **Essential Element 3: Computer Science Implementation** is to provide an opportunity to describe efforts to expand access to computer science courses in the defined STEM program.

Essential Element 3: Computer Science Implementation Requirements Checklist

☐ *Implementation plan:* The plan should highlight how decisions were made regarding which computer science courses and/or pathways were chosen and included in the defined STEM program. The plan should also indicate an effort is being made to actively recruit students to participate in computer science so that enrollment in these courses reflects the demographic of the school. Information regarding the indicators of school demographics in the implementation plan should be included.

☐ *Course list/guide:* A list/guide should be provided that indicates the computer sciences courses offered within the defined STEM program.

☐ *Course enrollment/completion data:* Enrollment should be delineated for each computer science course listed above along with completion data for the appropriate school year. A

comparison of computer science course enrollment data to the demographics of the entire school should be included in evidence to support this essential element.

Essential Element 4

STEM Instructional Feedback	Requirements Checklist
Evaluation indicators are used to provide feedback on targeted STEM instructional practices.	☐ A list of evaluation indicators that have been determined through modification of a local evaluation tool or locally-developed STEM instructional walkthrough tool for identifying targeted STEM instructional practices ☐ All evaluators are trained in observing targeted STEM instructional practices using the local evaluation instrument ☐ Examples of evaluator feedback on targeted STEM instructional practices in formative and summative evaluations using the local evaluation instrument

The goal of **Essential Element 4: STEM Instructional Feedback** is to allow teachers and administrators the tools needed to evaluate STEM instruction in the classroom. IDOE recognizes that many different evaluation models are used in secondary schools, but the STEM leadership team can work to align current indicators with STEM instructional best practices or support the development of a separate walkthrough tool.

Essential Element 4: STEM Instructional Feedback Requirements Checklist

☐ *List of evaluation indicators:* This artifact is a list and brief description of indicators used as the basis for feedback on STEM instructional practices. This list can be derived as a crosswalk from the current evaluation tool or developed as a separate STEM walkthrough tool.

☐ *Evaluators are trained:* Evidence (e.g., certificate of completion or training presentation) that evaluators have been trained in identifying STEM instructional practices and giving feedback to help educators reflect and identify areas of opportunity for growth.

☐ *Examples of feedback:* Examples of feedback on STEM instructional practices provided to educators in formative and summative evaluations are included with a brief narrative to provide context.

Essential Element 5

Technology Tools	Requirements Checklist
Multiple tools are used 50% of the time to engage and enhance student STEM learning (e.g., data collection/analysis, design, creation, virtual simulations, research and communication).	☐ Examples of technologies used ☐ Roster of technologies used and frequency of usage ☐ Samples of student products showing multiple tools are used ☐ Samples of unit/lesson plans highlighting multiple tools are used per lesson

The goal of **Essential Element 5: Technology Tools** is to promote effective and productive use of technology supports in the classroom. Thoughtful technology integration helps in producing meaningful student work and multiple tool use promotes diversification among disciplines.

Essential Element 5: Technology Tools Requirements Checklist

☐ *Examples of technologies:* Listed technologies should represent a complete and thorough list of all technologies used in the classroom by students. Such technologies should not only be used for student presentations, but also for simulations, data collection, and research.

☐ *Roster of technologies used and frequency of usage:* This list should also accompany all examples and provide a snapshot of the technology usage within the defined STEM program.

☐ *Samples of student products:* Student products should be available for viewing and should highlight use of multiple tools.

☐ *Samples of unit/lesson plans:* Unit/lesson plans should reflect the purpose for the technology used and how it impacts student learning.

Essential Element 6

Program Feedback	Requirements Checklist
A STEM Advisory Board is established consisting of at least three local STEM community partners from different sectors that provide feedback on the school's STEM program.	☐ Meeting minutes that include an agenda, participant list, discussion topics, and next steps ☐ Summary of revisions made to the defined STEM program based on STEM Advisory Board feedback

The goal of **Essential Element 6: Program Feedback** is to provide evidence of community engagement, continuous improvement, and strategic planning based on input from local STEM community partners. The STEM Advisory Board can work alongside the building-level STEM Leadership Team but should analyze data from the defined STEM program and offer assistance and suggestions for improvement.

Essential Element 6: Program Feedback Requirements Checklist

☐ *Meeting minutes:* The minutes should reflect a regular cadence of meetings that highlight a variety of topics of interest and data-driven decision-making to promote continuous improvement of the defined STEM program within the school.

☐ *Revisions:* The summary of revisions made based on STEM Advisory Board feedback should connect to the mission and vision of the defined STEM program. The summary should briefly describe the intended outcome or impact of the revision on the defined STEM program.

Additional Showcase Artifacts

These elements represent a menu of options to provide additional evidence related to the applicant school's STEM program, as defined in Essential Element 1 above. **Schools are required to select at least one option from each domain (column) when providing additional support for the application**. To achieve a total minimum score of 20 points for this section of the application, a combination of the remaining options can be selected. A rubric accompanies this section to provide schools with further information regarding requirements and point values for each option. To view this rubric and required evidence for each option, please click here. Schools that do not earn 20 points in this category will receive the designation of *Developing in STEM Certification.*

Schools earning less than 41 points on the Google Site portion of the application will be designated as *Developing in STEM Certification* and invited to participate in a Secondary STEM Certification Learning Series beginning in January 2024.

Additional Showcase Artifacts			
D1: Culture	**D2: Curriculum**	**D3: Instruction**	**D4: Partnerships**
D1: Sustainability Plan	D2: Student Portfolio Option	D3: STEM Instructional Approach Implementation	D4: Student Recognition

D1: Measurement of Students' Attitudes/Interests	D2: Employability Skills	D3: Student Instructional Work Groups	D4: STEM Career Exploration
D1: Access to STEM Courses and Programs	D2: Access and Opportunity for All Learners	D3: Common Language	D4: Community Engagement
D1: STEM Program Analysis	D2: Assessments	D3: Regional Programming	D4: Extended Learning
	D2: Student Voice		

Site Visit

Schools earning the required points on the Essential Elements and Additional Showcase Artifacts portion of the application will earn a site visit. Points earned during the site visit count towards total points needed for STEM Certification. Please prepare for the site visit using the checklist in the evaluation tool.

Additionally, the site visit contains Essential Elements. Schools must earn a score of three on all 13 Essential Elements for the site visit. Schools should reference the language within these indicators when planning for their site visit.

Schools earning less than 41 points on the Google Site portion of the application will be designated as *Developing* in STEM Certification and invited to participate in a Secondary STEM Certification Learning Series beginning in January 2024. STEM Certification is valid for five years. Schools and programs seeking to retain STEM Certification must reapply following this prescribed timeline and process:

Secondary STEM Certification Application Process

Completed applications due Friday, October 27.

Step 1: School leadership team conducts a self-evaluation using the 2023-2024 Secondary STEM Certification Self-Evaluation Reflection.

Step 2: School leadership team schedules a meeting with the IDOE STEM Certification Review Team to discuss Essential Element 1 and evidence required for remaining Essential Elements no later than Friday, September 15.

Step 3: After the meeting in Step 2, the STEM leadership team will use the Google Sites template (or approved alternative) to showcase evidence of the six Essential Elements,

including Essential Element 1 discussed at the meeting in Step 1. Additionally, the school will show evidence for no less than one additional item from the Additional Showcase Artifacts from each domain.

Schools will complete this form to obtain the Google Sites template. (Please note that schools approved to use an alternative to Google Sites, due to policy prohibiting the use of Google tools, are still required to follow the format prescribed in the Google Sites template. Schools must provide documentation of local policy if Google Sites is unavailable.)

Step 4: Schools procure an experienced STEM professional/educator with knowledge of the school's mission and vision to evaluate their site using the STEM Certification Evaluation Rubric. **This individual should ensure that all evidence links are accessible to those outside of the organization**.

Step 5: School leadership team submits the Google Site (or approved alternative) using this form by Friday, October 27.

Step 6: IDOE's STEM Certification Review Team, comprised of a minimum of two IDOE staff members, will review the Google Site (or approved alternative) using the 2023-2024 Secondary STEM Certification Evaluation Guide and Additional Showcase Artifacts Rubric.

Step 7: All applications will receive specific feedback regarding the evidence provided. Schools not meeting the required evidence for the Essential Elements will be deemed ***Developing***, will not receive a site visit, and will be provided access to a learning series deep dive in the Indiana Learning Lab covering the elements of the application. A school that shows all items in the checklists for the six Essential Elements and Additional Showcase Artifacts will be contacted to schedule a site visit.

Step 8: As part of the site visit, members of the school's STEM team will create a detailed presentation highlighting their STEM journey using the Secondary STEM Certification Site Visit Evaluation tool. After the presentation from the school's STEM team, members of IDOE's STEM Certification Review Team will tour the school.

Step 9: IDOE's STEM Certification Review Team will provide a final report to school leadership following the site visit.

Step 10: Applications receiving a minimum score of 94 points on the application and site visit rubric will be designated as **STEM Certified** by IDOE's STEM School Certification Review team. The designation will be embargoed until the official announcement is made via press release for the 2023-2024 school year.

Required Components of Application

- School information

- Superintendent information

- Principal information

- STEM School Leadership Team Chair contact information

- STEM Mission and Vision Statements
  - Mission statement
  - Vision statement
  - Connection between mission/vision and Indiana's Priorities for STEM Education

- STEM School Leadership Team Biographies

- Letter of support from the principal

- Letter of support from the superintendent

- Letter of support from community partner(s)

- Essential Element 1 (maximum of 1,500 words)
  - School Overview
  - Detailed narrative describing the vision for identified STEM programming connects to the mission of the STEM Leadership Team

- **Domain 1: Culture**
  - Domain summary (maximum of 500 words)
  - Short summary and description of each piece of evidence
  - Corresponding, uploaded documentation

- **Domain 2: Curriculum**
  - Domain summary (maximum of 500 words)
  - Short summary and description of each piece of evidence
  - Corresponding, uploaded documentation

- **Domain 3: Instruction**
  - Domain summary (maximum of 500 words)
  - Short summary and description of each piece of evidence
  - Corresponding, uploaded documentation

- **Domain 4: Partnerships**
  - Domain summary (maximum of 500 words)

- ○ Short summary and description of each piece of evidence
- ○ Corresponding, uploaded documentation

Please contact IDOE's Office of Teaching and Learning with any questions regarding the STEM Certification process via email at stemcertification@doe.in.gov.